

EXERCISES

For more practice, see *Extra Practice*.

Practice and Problem Solving

A Practice by Example

Example 1 (page 423)

$JDRT \sim JHYX$. Complete the congruence and proportion statements.

1. $\angle D \cong \underline{\hspace{1cm}}$

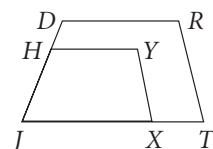
2. $\angle Y \cong \underline{\hspace{1cm}}$

3. $\angle T \cong \underline{\hspace{1cm}}$

4. $\frac{JD}{JH} = \frac{DR}{\underline{\hspace{1cm}}}$

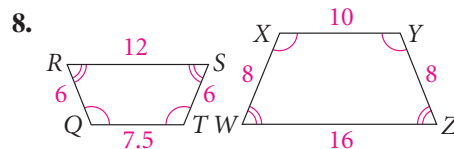
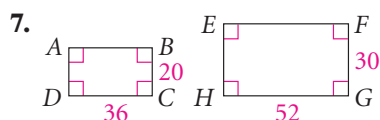
5. $\frac{RT}{YX} = \frac{\underline{\hspace{1cm}}}{JX}$

6. $\frac{\underline{\hspace{1cm}}}{DR} = \frac{YX}{RT}$

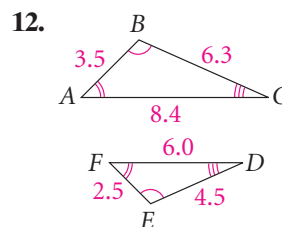
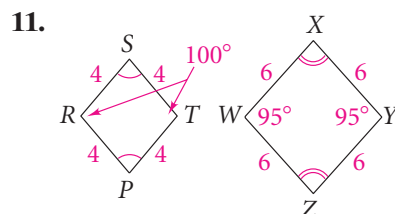
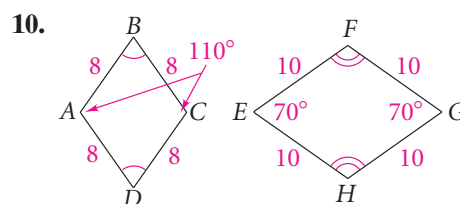
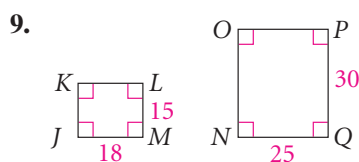


Example 2 (page 423)

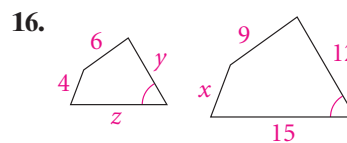
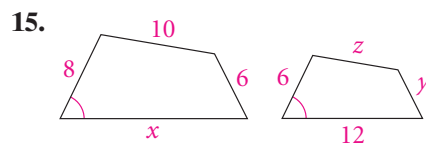
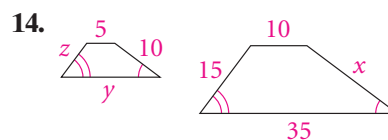
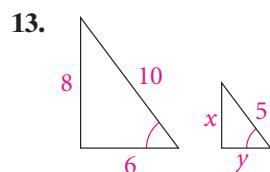
Are the polygons similar? If they are, write a similarity statement and give the similarity ratio. If they are not, explain.



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Example 3 x^2 Algebra The polygons are similar. Find the value of each variable.



Example 4 (page 424)

17. **Drawing** You want to draw an enlargement of a design that is painted on a 3 in.-by-5 in. card. You plan to draw on an $8\frac{1}{2}$ in.-by-11 in. piece of paper. What are the dimensions of the largest complete enlargement you can draw?
18. A map has dimensions 9 in. by 15 in. You want to reduce the map so that it will fit on a 4 in.-by-6 in. index card. What are the dimensions of the largest possible complete map that you can fit on the index card?

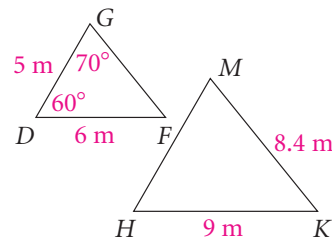
Example 5
(page 425)

19. **Electrical Equipment** A switch plate for a standard wall switch has the shape of a golden rectangle. The longer side of the switch plate is about 114 mm. How long is the shorter side? Round your answer to the nearest millimeter.
20. **Design** You want the banner you are creating from one piece of cloth to be a golden rectangle. The cloth will be cut from a bolt that is 54 in. wide. What are the dimensions of the largest banner that you can make?

B Apply Your Skills

$\triangle DFG \sim \triangle HKM$. Use the diagram to find the following.

21. the similarity ratio of $\triangle DFG$ to $\triangle HKM$
 22. the similarity ratio of $\triangle HKM$ to $\triangle DFG$
 23. $m\angle F$ 24. $m\angle K$ 25. $m\angle M$
 26. $\frac{DF}{HK}$ 27. HM 28. GF

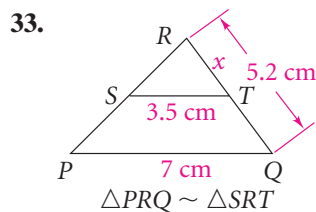
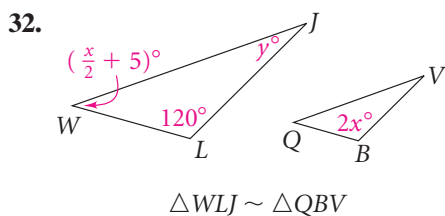


29. **Writing** Are two congruent figures similar? Explain.

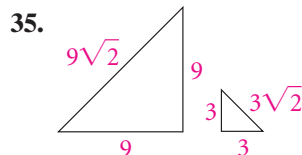
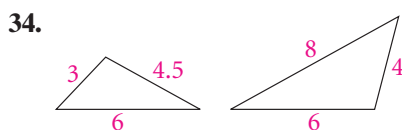


30. a. **Reading Math** What two symbols combine to form the congruence symbol?
 b. Explain why the congruence symbol makes sense.
31. **Art** An art class is painting a rectangular mural for a community festival. The students planned the mural with a diagram that is 80 in. long and 16 in. high. The mural is 4 ft high. Find its length.

Algebra Find the values of the variables.



The polygons in each exercise are similar. Find the similarity ratio of the first to the second.



36. Exercise 13 37. Exercise 14 38. Exercise 15 39. Exercise 16



Reading Math

A value reduced by $n\%$ is reduced to $(100 - n)\%$, and vice versa.



Logo Design A company logo is a rhombus with 4-cm sides and angles of 60° and 120° . Find the angle measures and side lengths if the logo is changed as follows.

40. reduced by 50% 41. reduced to 50% 42. reduced by 20%
 43. reduced to 20% 44. reduced by 75% 45. reduced to 75%

Find the other side length of the golden rectangle to the nearest tenth of an inch.

46. The shorter side is 10 in. 47. The longer side is 10 in.



48. Money From 1861 to 1928, U. S. paper currency measured 7.42 in. by 3.13 in. The dimensions of a current bill are shown here. Are the old and new bills similar rectangles? Explain.



49. Critical Thinking Are all circles similar? Explain.

50. Open-Ended Draw two polygons with sides in the ratio 2 : 1 that are not similar.



Challenge



51. a. Algebra You know that the golden ratio is about 1.618 : 1. You can use the definition of a golden rectangle to derive this ratio. Let $ABCD$ at the left be a golden rectangle with width 1. By the definition of golden rectangle, $ABCD \sim BCFE$. Fill in the reasons in the following argument.

1. $\frac{AB}{BC} = \frac{BC}{CF}$ 1. ?
 2. $\frac{x}{1} = \frac{1}{x-1}$ 2. ?
 3. $x^2 - x = 1$ 3. ?
 4. $x^2 - x - 1 = 0$ 4. ?

- b.** Using the quadratic formula to solve the equation in part (a), you get $x = \frac{1 \pm \sqrt{5}}{2}$. Explain why $x = \frac{1 - \sqrt{5}}{2}$ does not make sense in this situation.
c. The golden ratio is the ratio $x : 1$, or $\frac{1 + \sqrt{5}}{2} : 1$. Use a calculator to find the value of $x = \frac{1 + \sqrt{5}}{2}$ to the nearest ten thousandth.

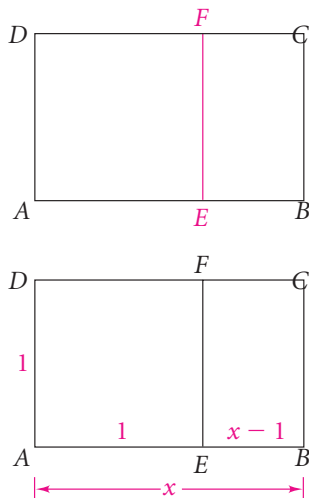
52. a. In the Fibonacci Sequence (see Lesson 1-1), each term after the first two is the sum of the two preceding terms. The first seven terms of the Fibonacci Sequence are 1, 1, 2, 3, 5, 8, and 13. Find the next seven terms.

b. Start with the second term. Here is the ratio of each term to the prior term.

$$\frac{1}{1} = 1 \qquad \frac{2}{1} = 2 \qquad \frac{3}{2} = 1.5 \qquad \frac{5}{3} = 1.6667$$

Find the next nine ratios. Round to the nearest ten thousandth.

c. Compare the ratios that you found in part (b) to the golden ratio.



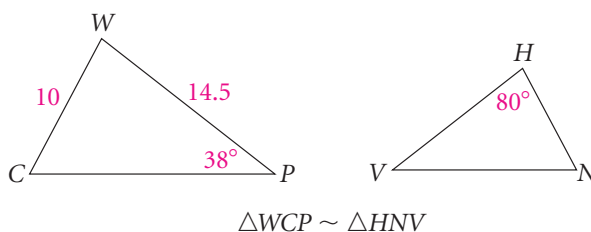


Standardized Test Prep

Quantitative Comparison

Compare the boxed quantity in Column A with the boxed quantity in Column B. Choose the best answer.

- A. The quantity in Column A is greater.
- B. The quantity in Column B is greater.
- C. The two quantities are equal.
- D. The relationship cannot be determined from the information given.



Column A

Column B

- | | |
|-----------------|-------------|
| 53. VH | WC |
| 54. $m\angle N$ | $m\angle C$ |
| 55. $m\angle N$ | $m\angle P$ |



Take It to the NET

Online lesson quiz at
www.PHSchool.com
 Web Code: afa-0802

Short Response

56. Quadrilateral $ABCD \sim$ quadrilateral $JKLM$ with a similarity ratio of 2 : 3.
- a. If $BC = 8$ cm, find KL .
 - b. If $m\angle BCD = 38$, find $m\angle KLM$.

Mixed Review

Lesson 8-1

If $\frac{x}{7} = \frac{y}{9}$, complete each of the following using properties of proportions.

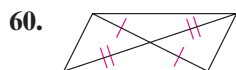
57. $9x = \square$

58. $\frac{x}{y} = \frac{\square}{\square}$

59. $\frac{x+7}{7} = \frac{\square}{\square}$

Lesson 6-3

Can you conclude that the quadrilateral is a parallelogram? Explain.



Lesson 4-5

Use the marked $\triangle CEA$ for Exercises 63–66.

63. Name the isosceles triangles in the figure.

64. $\overline{CD} \cong \underline{\hspace{1cm}} \cong \underline{\hspace{1cm}}$

Find the value of each of the following.

65. AE

66. $m\angle A$

